Clinical Study of Chronic Obstructive Pulmonary Disease (COPD) Post Tuberculosis Among Patients at a Tertiary Hospital

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ABSTRACT

Background: COPD is one of the most common non-communicable diseases in the world, as well as in India. Airflow obstruction is the most common anomaly in COPD patients. COPD is not just a disease that affects elderly, male smokers; it affects both men and patients worldwide and is especially frequent in low- and middle-income nations.

Aims & objectives: The goal of this study was to look into the aetiology and clinical aspects of COPD after tuberculosis in tertiary hospital patients.

Material and Methods: This was prospective observational research on newly diagnosed COPD patients who had previously been diagnosed with tuberculosis in OPDs and medical wards.

Results: 92 patients with a history of tuberculosis were diagnosed with COPD throughout the study period and were included in the study. The average age was 61.46 years and 11.70 years. The age group 51-70 years old was the most frequently involved (68 %). The average BMI was 18.5 3.2 kg/m2. Cough (96%) was the most common clinical symptom, followed by expectoration (89%), fever (37%), edoema foot (13%), cachexia (15%), and skeletal muscle wasting (15%). (11 percent). According to GOLD standards, 28 percent, 43 percent, 17 percent, and 11 percent of the study participants were in stages 1, 2, 3, and 4, respectively. There was no history of smoking in any of the patients. 24 percent had been exposed to biomass smoke and 17 percent had been exposed to passive smoking at home (chula). Hyperinflation (67 percent), enlarged bronchovascular markings (76 percent), tubular heart (24 percent), low-placed diaphragm (61 percent), and the presence of bullae (35 percent) were all found on a chest X-ray. The most common comorbidity in research participants was a history of pulmonary tuberculosis (100 percent). Right heart failure (13 percent), pneumonia (11 percent), bronchiectasis (11 percent), and pneumothorax (4 percent) were all identified in study subjects at the time of diagnosis.

Conclusion: Individual vulnerability to COPD is determined by both personal and environmental risk factors. The main causes of COPD in patients include household, environmental air pollution, and second-hand smoke. COPD might have a less severe impact on a patient's life if it is detected early.

Keywords: COPD, GOLD criteria, spirometry, cough

INTRODUCTION

Chronic obstructive pulmonary disease (COPD), asthma, pneumoconiosis, interstitial lung disorders, and pulmonary sarcoidosis are examples of chronic respiratory diseases. COPD and asthma are the most common of these disorders[1]. COPD is one of the most common non-communicable diseases in the world, as well as in India. Airflow obstruction is the most common anomaly in COPD patients. Cigarette smoking among males and patients, longer population survival, and high levels of air pollution, particularly in emerging nations, have all been linked to a rise in the global burden of COPD[2]. Although the data is insufficient to draw a causative association for these risk factors, traffic and other outdoor pollution, secondhand smoking, biomass smoke, and dietary variables are likely to cause COPD. COPD is not just a disease that affects elderly, male smokers; it affects both men and patients worldwide, and is especially frequent in low- and middle-income nations[3,4]. Early-stage COPD patients are less symptomatic than men, which, combined with their less common health-seeking behaviour, adds to the difficulty of diagnosing COPD. Despite the fact that COPD is more likely to kill individuals than breast and lung cancer combined, it receives little attention as a patient's health condition[5]. Cigarette smoking, genetic alpha 1 antitrypsin deficiency, inhalational tobacco smoke exposure, and occupational dust and chemicals are the most prevalent causes of

COPD[6]. Dyspnea, chronic cough with or without sputum production, and poor exercise tolerance are all symptoms of COPD. During exacerbations, the severity of the symptoms increases[7]. In several population-based studies across India, the prevalence of COPD ranged from 2 to 22 percent among men and 1.2 to 19 percent among patients.

Aims & objectives: The goal of this study was to look into the aetiology and clinical aspects of COPD in tertiary hospital patients with past history of tuberculosis.

MATERIAL AND METHODS: This was a prospective observational study undertaken in the general medicine department. The study was approved by the institutional ethics committee.

Inclusion criteria: Patients with a history of tuberculosis who have had a chronic cough for more than two months, sputum production, and dyspnea for two or more years. Patients with spirometry values of forced expiratory volume (FEV) 1.0/forced vital capacity (FVC) 70%; FEV 1.0 80% of predicted normal; and patients with a FEV1 rise of less than 12% and 200ml after bronchodilator treatment. The current investigation included newly diagnosed COPD patients from emergency rooms and medical wards.

Patients with broncho-reversibility of more than 12 percent and 200 ml of FEV1 and a history of asthma were excluded. Any cardiovascular disease in patients with active TB. I'm not interested in taking part.

The patient was informed about the study and given formal permission to participate. We collected demographic information as well as a comprehensive history of cough and dyspnea, past therapy, and family history of asthma or COPD, as well as risk factors (tobacco smoking, passive smoking, past lung TB, indoor air pollution, biomass smoke exposure). A thorough physical examination was conducted to determine the presence of COPD and its severity. The following parameters were measured using an electronic spirometer: FVC, FEV 1.0, FEV 1.0/FVC, peak expiratory flow rate, and forced expiratory flow 25 percent–75 percent. These measures were repeated after inhaled salbutamol was administered with a valve-triggered spacer device to test broncho-reversibility. All patients had a chest X-ray, 2D echo, and arterial blood gas estimate. The information gathered was entered into a Microsoft Excel spreadsheet. The descriptive statistics were used in the statistical analysis.

RESULTS

During the trial period, 92 patients with a history of tuberculosis and COPD were diagnosed and included in the study. The average age was 61.46 years ± 11.7 years. The age group 51-70 years old was the most frequently involved (68 percent). The average BMI was 18.5 ± 3.2 kg/m2. Cough (96%) was the most common clinical symptom, followed by expectoration (89%), fever (37%), edoema foot (13%), cachexia (15%), and skeletal muscle wasting (15%).

Table 1: Demographic and clinical details of COPD patients

Characteristic	No. of patients (n-92)	Percentage
Age (years)		
≤30	2	2 %
31-40	6	7 %
41-50	10	11 %
51-60	32	35 %
61-70	30	33 %
>70	12	13 %
Mean age (years)	61.46 ± 11.70	
Mean BMI (kg/m^2)	18.5 ± 3.2	
Symptoms		
Cough	88	96 %
Expectoration	82	89 %
Fever	34	37 %
Edema feet	12	13 %
Other clinical features		
Cachexia	14	15 %
Skeletal muscle wasting	10	11 %

Staging of COPD was done according to GOLD guidelines, 28 %, 43 %, 17 % and 11 % study patients were from stage 1,2,3 and 4 respectively.

Table 2: Classification and staging of COPD according to GOLD guidelines.

Stage of COPD	FEV1 (%)	No. of patients (n-92)	Percentage
GOLD 1: Mild	FEV1 >80% predicted	26	28 %
GOLD 2: Moderate	- 50% <FEV1 <80% predicted	40	43 %
GOLD 3: Severe	30% <FEV1 <50% predicted	16	17 %
GOLD 4: Very severe	FEV1 <30% predicted.	10	11 %

COPD: chronic obstructive pulmonary disease; FEV1: forced expiratory volume in 1 second; GOLD: Global Initiative for Obstructive Lung Disease

There was no history of smoking in any of the patients. 24 percent had been exposed to biomass smoke and 17 percent had been exposed to passive smoking at home (chula). Hyperinflation (67 %), enlarged bronchovascular markings (76 %), tubular heart (24 %), low-placed diaphragm (61 %), and the presence of bullae (35 %) were all found on a chest X-ray.

Table 3: Type of smoke exposure and radiological findings

Characteristics	No. of patients (n-92)	Percentage
Type of smoke exposure		
Passive tobacco smoke	22	24 %
Biomass smoke (chula)	16	17 %
Non-smoker	92	100 %
Radiology (percentage)		
Hyperinflation	62	67 %
Increased bronchovascular markings (BVM)	70	76 %
Tubular heart	22	24 %
Low Placed diaphragm	56	61 %

The most common comorbidity in study participants was a history of pulmonary tuberculosis (100 percent). Right heart failure (13 percent), pneumonia (11 percent), bronchiectasis (11 percent), and pneumothorax (4 percent) were all identified in study subjects at the time of diagnosis.

Table 4: Co-morbidities and Complications

Characteristics	No. of patients (n-92)	Percentage
Co-morbidities		
Past History of pulmonary TB	92	100 %
Cardiovascular disease	16	17 %
Gastro-esophageal reflux disease	10	11 %
Diabetes mellitus	8	9 %
Carcinoma lung	4	4 %
Complications		
Right heart failure	12	13 %
Pneumonia	10	11 %
Bronchiectasis	10	11 %
Pneumothorax	4	4 %

DISCUSSION

Chronic bronchitis was found to be 3.49 percent (4.29 percent in males and 2.7 percent in females) in individuals over 35 years in the Indian Research of Asthma, Respiratory Symptoms, and Chronic Bronchitis (INSEARCH) study of 85,105 men and 84,470 patients from 12 urban and 11 rural sites. Individual vulnerability to COPD is determined by both personal and environmental risk factors[8]. Although not fully understood, there is indirect evidence showing patients are more prone to acquiring COPD or having a faster disease development than men for a given degree of risk exposure[9]. After the age of 30, the age-specific prevalence of COPD grew significantly, with males experiencing a higher increase than women, with the highest prevalence among patients in the 75–79

year age range. The Lung Health Study was the first to notice gender differences in hyper-responsiveness. Anand Karnam looked at 87 COPD individuals who had both clinical and functional indications of the disease[10]. According to the Global Initiative for Chronic Obstructive Lung Disease staging, 49.4 percent of those with COPD were in Grades 1 and 2, while 50.5 percent were in Grades 3 and 4. The severity of symptoms was connected to how long they had been present. The majority of the patients were exposed to biomass smoke, with a biomass index of 136.8 hour-years on average[11]. Other than smoking, a number of risk factors play a significant role in the development of COPD. In patients, biomass exposure is a substantial risk factor, and the length of exposure is related to the severity of the disease. The current study found similar outcomes[12]. In a cross-sectional study of 900 non-smoking patients over the age of 30, Johnson P et al used a combination of clinical examination and spirometry to assess COPD. COPD prevalence was found to be 2.44 percent overall in the study, with COPD prevalence being 2.5 percent higher in biomass fuel users than clean fuel users (2 percent), and two times higher (3 percent) in patients who spend more than 2 hours per day in the kitchen cooking. Although no statistically significant outcomes were found in this investigation, solid fuel use was linked to an increased risk of COPD. The gender-related disparities in clinical presentation, radiological manifestation, and COPD co-morbidities were examined in 702 COPD patients by Jain N et al. In males, tobacco smoke in the form of beedi smoking was the most common source of smoke exposure, whereas smoke from biofuel burning was the most common source of smoke exposure in females. Females reported increased dyspnea, more severe bronchial obstruction, more exacerbations, and a higher incidence of systemic symptoms when compared to males. In addition, compared to males, females smoked less and had a lower incidence of productive cough, a lower BMI, fewer co-morbidities, and fewer hospital admissions[13]. Males were more likely than females to have an emphysema-predominant phenotype, while females were more likely to have airway-predominant illness. Patients had higher proportionate contributions of household air pollution and secondhand smoke to COPD DALYs than men, whereas men had higher contributions of smoking and occupational hazards. Patients are more likely to suffer from the negative respiratory effects of tobacco smoking, developing COPD at a younger age and having a larger degree of lung function impairment for a given level of tobacco exposure[14]. Furthermore, comorbidities linked with COPD should be addressed. Cardiovascular comorbidities are common (75.1 percent) among COPD patients, as other comorbidities such as cancer, anxiety, mental disorders, substance misuse, and musculoskeletal and connective tissue illnesses. Anxiety and depression are linked to a lower quality of life and less adherence to treatment, and they contribute significantly to COPD-related morbidity.

CONCLUSION

Individual vulnerability to COPD is determined by both personal and environmental risk factors. The main causes of COPD in patients include household, environmental air pollution, and second-hand smoke. COPD might have a less severe impact on a patient's life if it is detected early. Females were more likely to exhibit a radiological pattern called "increased Broncho vascular markings" (which matches the "dirty chest" appearance seen in chronic bronchitis). Several researchers also found that male smokers with COPD have more advanced emphysema than patients. Because patients are more likely to go untreated or postpone treatment for tuberculosis as a result of current socio-cultural systems, cases of COPD post-tuberculosis may rise in the future, particularly among women.

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